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ABSTRACT

This study examined the impact of keyboarding instruction on the acquisition of word processing skills. Over a 6-week period, 6 third grade students were studied as they used the "Type to Learn" keyboarding program. Each student spent an average of 45 minutes on the computer each week. Data collection consisted of observations, questionnaires, and interviews. Students were observed as they progressed through the "Type to Learn" program. The students were then interviewed to determine their attitudes and comfort level with regard to the keyboard and word processing. This study demonstrates that 6 weeks is an appropriate time frame for learning the keyboard. Most of the students in this study used self-talk to reinforce their learning as they located the keys. The students learned the location of the keys and typed at a reasonable pace without using the correct finger positions. These findings directly contradict the assumptions made by other researchers. The students reported that they were so comfortable with the keyboard that they would choose to type a story rather than write with pencil and paper. Implications of this study call for future research with students using a word processing program. The students need practice on the keyboard using a word processing program. As this occurs, it would be interesting to study students using word processing with a particular focus on revising and editing on the computer rather than on pencil and paper. An appendix lists the questions students were asked a the conclusion of the study. (Contains 28 references.) (Author)

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A Study of Keyboarding Instruction and the Acquisition of Word Processing Skills

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Susan Gemmell

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Abstract

This study examined the impact of keyboarding instruction on the acquisition of word processing skills. Over a six-week period, six third grade students were studied as they used the *Type to Learn* keyboarding program. Each student spent an average of forty-five minutes on the computer each week.

Data collection consisted of observations, questionnaires, and interviews. Each student was observed as they progressed through the *Type to Learn* program. After six weeks of keyboarding instruction, the students used a word processing program. The students were then interviewed to determine their attitudes and comfort level with regard to the keyboard and word processing.

This study demonstrates that six weeks is an appropriate time frame for learning the keyboard. Most of the students in this study used self-talk to reinforce their learning as they located the keys. The students learned the location of the keys and typed at a reasonable pace without using the correct finger positions. These findings directly contradict the assumptions made by other researchers. The students reported that they were so comfortable with the keyboard that they would choose to type a story rather than write with pencil and paper.

Implications of this study call for future research with students using a word processing program. The students need practice on the keyboard using a word processing program. As this occurs, it would be interesting to study students using word processing with a particular focus on revising and editing on the computer rather than on pencil and paper.

Computers are playing an increasing role in all aspects of society, including the classroom. In the past few years, many companies have produced computer software programs to be used in the classroom. These programs include word processing. However, many of these programs assume that students have a basic knowledge of the keyboard. In my own experience, I have found that my students lack the adequate keyboarding skills to be competent in word processing. My students tend to spend more time looking for the keys rather than focusing on the thoughts they want to communicate. Until this point, it has been a more effective use of time for my students to use paper and pencil rather than use word processing. However, it was my intention to provide my students with keyboarding instruction so that they can take advantage of word processing.

The purpose of this study was to examine the following question: How does keyboarding instruction affect the acquisition of word processing skills? In this study I observed third grade students as they progressed through a keyboarding program, *Type to Learn* (Sunburst, 1999). Other questions for consideration include: What are the students' current levels of keyboarding skills? Second, How much keyboarding instruction is needed? Also, what is an appropriate length of time the instruction for the instruction to take place?

Within the last five years, my school district has revised its curriculum to provide rigorous standards for its students. The curriculum places a strong emphasis on reading, writing, math, and science. However, there are other standards in place, including those for Library/Business/Computer Education. These standards specify criteria to be met at

the end of the primary level through high school level. According to these standards, a student completing fifth grade should be able to:

- Type 25 wpm with one error
- Independently demonstrate the ability to use word processing and graphics software

At the time these standards were adopted, the students were receiving little or no formal keyboarding instruction.

Within the last year Roberts Elementary School received a CSRD grant which allowed the school to purchase thirty-eight brand new computers. Twenty-eight computers are now located in a computer lab while the remaining computers are located in the school library. Prior to the receipt of the grant, the school was able to purchase various lab packs of computer software, including *Type to Learn*. At this point, nine classes, grades three through five, were scheduled to receive keyboarding instruction. Each class received fifteen minutes per week of typing practice. Few students were able to complete all levels of the program by the end of the school year. This school year students in grades four and five are required to have keyboarding instruction. The time frame is once again fifteen minutes. This instruction is optional for students in grades three. Two of the four third grade teachers have chosen to have their students to utilize the *Type to Learn* program.

Roberts Elementary School teachers agree that keyboarding is necessary skill for their students to learn. Many teachers feel that keyboarding is a necessity if their students are going to use word processing competently but agree that fifteen minutes one time per week of keyboarding instruction will not greatly enhance their students' word processing skills.

Teachers were also asked for suggestions to solve the problem of time limitations related to keyboarding instruction. Two alternatives were discussed. First, students would receive their own photocopied, laminated version of the keyboard. This would be used for keyboarding practice at their desk under the supervision of the classroom teacher. There are advantages to this form of keyboarding instruction. First, the instruction could take place at any convenient time during the school day. Students would remain in the classroom and would not spend time traveling to the library or computer lab for their scheduled computer time. The use of paper keyboards would allow specific and guided practice for students. A suggestion was also made for students to use the paper keyboards to practice their spelling words. This type of keyboarding instruction would be ideal for those students just learning the placement of letters on the keyboard.

There were also some concerns about the use of paper keyboards. First, teachers were concerned that this form of keyboarding instruction would not motivate the students. They worry that once students master the placement of letters, they will become bored with the paper keyboard. Once the students become bored then, their motivation to use the keyboard will decrease. The *Type to Learn* program, for example, allows students to play games once they complete a lesson. A second concern about the paper keyboard was accuracy. The use of the paper keyboard makes it difficult to check the students for accuracy because the text does not appear on a screen. Also, one teacher would be responsible for checking the accuracy and progress for the entire class of twenty-five to thirty students. The *Type to Learn* program, however, keeps a record for each student. Students using this format are able to track their own progress.

A second suggestion was proposed to teachers regarding the time constraint issue. A suggestion was made for students to receive massed practice for the first month of school. This instruction would take place three days per week during twenty-minute sessions. Overall, this suggestion was well received. Most teachers agreed that the first month of school is a very flexible time. The students are not yet locked into a routine and teachers are just beginning to know their students. These mass practice sessions would give teachers an opportunity to assess their students' current levels of keyboarding ability. This would prove especially true for the fourth and fifth grade teachers. Massed practice would give these students an opportunity to review or refresh their keyboarding skills. In addition, schedules are also more open at this time of year. Many special subject teachers have not yet developed schedules for working with individual students.

When this study began, there was not one situation that would accommodate all teachers. The faculty was faced with the dilemma of one-computer classrooms, scheduling conflicts and strenuous academic standards. Most teachers interviewed expressed their frustrations related to keyboarding instruction. They realize its value but are constrained by insufficient computers and limited time in their schedules. Teachers, then, will have to work within their current means to increase their students' keyboarding skills. This may include massed practice or the use of paper keyboards to supplement their *Type to Learn* instruction.

"Research has shown that the development of typing skills in young children is linked with improved language arts skills, gains in spelling, vocabulary, and written composition." (Mosely, Schlossberg, & Varas, 1999,p.1). As their keyboarding skills increase, students will also see the ease of writing on the computer.

"Keyboarding, simply defined is learning the correct manipulation of the keys on a computer/ typewriter keyboard and using that keyboard for basic data input"(Jackson and Berg, 1986, p. 8). While there is a simple definition for keyboarding as a concept, the actual delivery of keyboarding instruction is quite another matter. Within the last fifteen years, keyboarding instruction has become quite a controversial topic among educators. Kahn and Freyd (1990, p. 84) highlight the debate in simple terms. One side argues that keyboarding should be taught prior to using word processing so that students may avoid future bad habits. The other side of this debate argues that "mandatory keyboarding instruction as a prerequisite for writing with a computer turns students away from a useful tool"(p.84).

Despite this debate, most educators agree that young children should be taught keyboard familiarization. However, there are issues that surround this as well. First, there are many educators who wonder at what age children should begin keyboarding instruction. Second, some educators struggle with the issue of time constraints and how keyboarding can be taught within their curriculum. Another issue that surrounds keyboarding instruction is access to equipment. Kahn and Freyd (1990), Jackson and Berg (1986), Blinderup (1998) and others all advocate the use of a paper keyboard. However, Buchanan (1993), Nichols (1995), and Sormunen (1991) all support the use of various computer software programs for keyboarding instruction. Another underlying issue with keyboarding instruction is speed versus accuracy. Should the purpose of keyboarding instruction be the number of words typed per minute or should the focus be on typing each letter and word with minimal error? However, the issues of speed and accuracy are only practical when there is access to a computer lab.

What is the best age to begin keyboarding?

In the elementary school, formal keyboarding instruction begins at the third grade level. "Third grade students are physiologically ready to learn keyboarding and studies have shown that they can become keyboard proficient" (Jackson and Berg, 1986, p.8). Buchanan (1993) also agrees that many third grade students "are able to handle the motor demands of training in keyboarding skills"(p. 13).

How much time is required for keyboarding instruction?

The time required for keyboarding instruction varies from program to program. This instruction time can vary from no formal instruction to thirty hours of instruction. For example, Balajathy (1988) presented a study conducted by Campbell (1973). The students in this study did not receive any formal typing instruction. Rather, the students used hunt and peck methods when completing written assignments on the keyboard. "Despite this limited instruction, Campbell found that the typing group displayed significant gains in reading achievement over the handwriting group"(p. 40). Kahn and Freyd (1990) shared similar results from their study. They observed elementary children writing with word processing. They found that these children "developed their own hunt and peck systems which were at least as efficient as their handwriting, and in many cases quicker and less tedious" (p. 87).

In other cases, young students have been introduced to keyboarding using a laminated keyboard. The average time for this method was approximately four weeks. Kahn, Avicolli, and Lodise (1990), Pohl and Groome (1994) and McClendon (1989) utilized a laminated, paper keyboard to introduce students to the keyboard.

McClendon (1990) and Kahn, Avicolli, and Lodise (1990) found that four weeks was sufficient to improve their students' writing.

The factor of time increases greatly when keyboarding instruction takes place using a computer software program. Wetzel (1985) and Jackson and Berg (1986) agree that ten hours of instruction is adequate time for keyboarding instruction.

What methods for keyboarding instruction can be used?

Business educators and software publishers argue that children need to be taught correct finger positions but many educators argue that children should have the experience of writing on the computer without a focus on correct fingering. Despite this debate, keyboarding instruction has proven to be beneficial. There are two common methods for keyboarding instruction. Many educators have chosen to teach the keyboard using a laminated paper keyboard. Still others teach the keyboard in a computer lab situation. The method varies greatly from school to school depending upon access to equipment, time available for instruction, and age of the students. Regardless of the program, though, most educators agree that some keyboarding instruction is necessary so that students can make effective use of the computer.

Nichols (1995) and Fouche (1987) found success teaching keyboarding in a computer lab situation. The results of these studies show that students learn the keyboard effectively when using either a paper keyboard template or using computer programs in a lab setting. The decision to teach keyboarding must be made while considering the needs of your students, access to equipment, and time. Regardless of the method chosen to introduce the keyboard, students need "keyboarding practice using a word processing program. This enables students to be familiar with the features of word processing

program by the time they have completed their keyboarding instruction"(Fidanque, 1990, p. 37).

What is the purpose for keyboarding instruction, speed or accuracy?

Nichols (1995), Fouche (1987), Sormunen (1991) and Jackson and Berg (1986) feel that speed should take precedence over accuracy. Kahn and Freyd (1990) present another position on the issue of speed versus accuracy. "Speed need only be as fast as children can write with a pencil and paper, or as fast as children can think of what to say and how to spell it" (p. 89). They further argue that accuracy should not be an issue when students are writing on an electronic screen. Kahn, Avicolli, and Lodise further support this position on accuracy. "Children are frequently composing as they type. If they look at the keys it does not slow them down to a significant extent. Furthermore, if they hit a wrong key, the error can be deleted simply and quickly"(Kahn, Avicolli, and Lodise, 1990, p.35).

"Research on writing with typewriters and with computers has established over the last fifty years that children, when they learn the location of the keys, find using a keyboard easier than writing with a pencil and a paper"(Kahn and Freyd, 1990, p. 89). Balajthy (1988) presents evidence to validate the position of Kahn and Freyd (1990) regarding speed, typing and handwriting. He presents results from a study conducted by Campbell (1973). Campbell argues that the task of typing is easier for young students because it simply involves letter recognition and locating those letters on the keyboard. Handwriting, though, "demands closer attention to the formation of letter shapes and considerable eye-hand coordination" (Balajthy, 1988, p. 40).

Based on these various viewpoints, it seems that the goal of keyboarding instruction for young students should not be solely based on speed and accuracy. An important goal of keyboarding instruction is that students learn the location of individual keys. Once this occurs, students will be able to communicate their ideas more effectively. "Students' speed and accuracy should continue to improve as they use the computer for academic tasks, especially if the teacher follows up on previous instruction and practice" (Wetzel, 1985, p.16).

Educators agree that keyboarding is a valuable skill that should be taught to students at the elementary age. Students have been introduced to the keyboard using a laminated, paper keyboard and computers in a computer lab situation. Both methods have proven to be successful. However, young students should not be expected to meet speed and accuracy requirements. Rather, Kahn and Freyd note, "Children need to learn the location of the keys so they can write their ideas easily"(p. 35). However, once the initial instruction takes place, it is important that students have many opportunities to practice their new skill using a word processing program.

Study Design

The purpose of this study was to examine third grade students as they learned the keyboard. The research examined students' current level of keyboarding experience and how much instruction was required to use a word processing program.

Setting

This study took place in an elementary school located in central Pennsylvania. This school, located in a small urban school district, has an enrollment of about five

hundred students. The current student population consists of approximately 45.9% Hispanic, 28.6% Caucasian, 22.5% African American and 2.8% Asian students.

Sample

The participants in this study were nineteen third grade students. However, the researcher chose to focus on six students to make the study more manageable. The six students were chosen from the group of nineteen for various reasons. Three children were selected because they had prior experience using *Type to Learn* and used a computer home. Three other students were selected because they demonstrated high levels of motivation and an ability to communicate verbally during initial observations using *Type to Learn*. The participants in this study consisted of three female and three male students. These students were of average to above average academic ability.

Keyboarding Method

Students learned the keyboard using the computer software program *Type to Learn* (Sunburst, 1999). *Type to Learn* was chosen due to its availability. "Research has shown that "the development of typing skills in young children is linked with improved language arts skills, gains in spelling, vocabulary, and written composition" (Mosely, Schlossberg,& Varas, 1999,p.1). The Sunburst Corporation contends that *Type to Learn* builds speed and accuracy through twenty-two self-paced lessons.

Time Frame

This study began the third week of September and took place over an eight-week period, ending in the middle of December. This instruction took place in the school library three days each week for six weeks. While formal keyboarding instruction was limited to the sessions in the library, students received supplemental instruction in the

computer lab. This instruction focused on revising and editing using *Microsoft Word.* Students were taught to use features such as backspace, delete, font size and style throughout the six-week period.

While in the library, students were assigned to one of ten computers to use each session. The class was divided in half for each for each of these sessions. One half of the class used *Type to Learn* for fifteen minutes of the period. The other students read library books silently at tables throughout the library. A timer was used to keep the students on schedule. At the conclusion of the first fifteen minutes, the first group completed their turn and logged off their computers. The second group then came over to the computers, logged on and completed their lesson on *Type to Learn.*

Role

The primary role of the researcher was to collect data through note taking and general observations. However, she was also the teacher of the class. The researcher was responsible for keeping both groups of students on task. Many times, those students who were reading needed reminders to read quietly and stay focused on the book they were reading. The students at the computers needed fewer reminders. Generally they remained focused and on task. Management of behavior became a less important issue as the study progressed.

Data Collection

In this study the researcher looked at keyboarding instruction and how it helps students acquire word-processing skills. Over the course of the six-week period, the researcher observed students as they used *Type to Learn.* Data were recorded from notes taken during each session. Notes were taken on each student one time per week. Two

students were observed during each session. This was possible in that the participants alternated turns on the computer. Note taking was discontinued after approximately four weeks. The researcher began to observe similar behaviors for each student. Student behaviors began to seem repetitive. However, the students were still observed and notes were jotted down as needed. In addition, data were taken from each student's record from the *Type to Learn* program. This data included current levels on the program, words per minute, and an accuracy level.

The issue of correct finger positions was examined. In the *Type to Learn* program students are strongly encouraged to keep their fingers on the home row keys. These positions are reviewed at the beginning of each lesson. Throughout this study, students were observed to see if correct finger positions were used.

At the conclusion of the six weeks, time allotted for keyboarding instruction was reduced to one time per week. This decision was based on recommendations from research and also a judgment by the researcher about student readiness. All six students had progressed to the same lesson in *Type to Learn*. At this point in the study, students were given the opportunity to use a word processing program.

The students were asked to complete a writing assignment on the computer using a word processing program. Students were videotaped while they completed this assignment. Students were observed to see how quickly and easily they could locate the keys on the keyboard. Once completed, the students were interviewed about their experience using word processing. There were five interview questions in all. The questions determined their ease in finding the letters and using correct fingering. (see Appendix for question guide.) Students were interviewed on an individual basis.

Analyzing Data

The data collected throughout this study were analyzed on a continuous basis. Notes were taken and observations were made. The researcher made analytic memos in an effort to evaluate student behaviors as the study progressed. Data were compared between students to determine if common themes and issues occurred. Data were also analyzed through student interviews. These data were also analyzed to determine student attitudes, comfort levels, and self-concept with regards to keyboarding and word processing.

Findings

The purpose of this study was to examine the following question: How does keyboarding instruction affect the acquisition of word processing skills? In this study I observed third grade students as they progressed through a keyboarding program, *Type to Learn* (Sunburst, 1999). Other questions for consideration include: What are the students' current levels of keyboarding skills? Second, How much keyboarding instruction is needed? Also, what is an appropriate length of time for the instruction to take place?

On-Task

The first theme to emerge, perhaps the least surprising, was on-task behavior. The students followed procedures while using Type to Learn. These procedures consisted of logging on and off the program, typing the letters, and making decisions such as choosing a game break. The students worked independently for their fifteen-minute period. This took place with little or no peer interaction or interaction with me. In addition the students showed that they were able to self-monitor their own progress.

Self-monitoring would occur as the accuracy flashed on the screen. In one instance Darryl comments aloud: "95%... I messed up!"

These behaviors demonstrate that the students were involved in a learning process. The students followed the basic procedures of the program and were on task for their designated time. The students concentrated on the task at hand and were very much involved in learning the location of the keys. Furthermore, the students were able to check their own work and monitor their own progress. As the students moved through the program, an accuracy level appeared on the screen. Each time the accuracy appeared the students received immediate feedback. This feature minimized the need for feedback from me.

Correct Finger Positioning

Type to Learn is computer-driven rather than teacher-led. In this program, students complete a series of lessons that emphasize correct seating and finger positioning. At the beginning of each lesson, previously learned keys are reviewed and then the new keys are introduced. The program's design gives constant reminders to students to keep their fingers on the home keys. This expectation is very much supported throughout research on keyboarding instruction. Jackson and Berg (1986), Buchanan (1993) and Binderup (1988) advocate the need for correct finger positioning.

The findings of this study directly contradict the rationale provided by research and the *Type to Learn* manual. "*Type to Learn* teaches proper keyboarding techniques by combining a demonstration of the reach for each new key with the actual typing of the student" (Mosely, Sclossberg, and Varas, 1999, p. 1). During the four weeks of observation, all six students were observed not to use correct finger positioning. At the

beginning of each lesson, the students were observed to have their fingers on the home keys. However, observations indicate the students used two hands in twenty instances. By contrast, the students used one finger in twenty-eight instances. Not only did these six students favor one hand rather than two, they also switched right and left hands on nine occasions. Regardless of the hand, one finger was used to locate and touch the keys.

These initial observations were further supported during the next two phases of this study. After six weeks of formal keyboarding instruction the students were once again observed, but using a word processing program. These observations also indicate that five of the six students used two fingers, one right and one left, to type. Four of these students used their index fingers while Melinda used her two middle fingers. Despite the lack of correct fingering, the students seemed to find the keys with ease throughout their word processing session.

Following their word processing session the students were asked if they were comfortable using correct fingering or putting their fingers on any keys. They were also asked how they were able to type the fastest, with or without correct fingering. Four of these students expressed that they are more comfortable and can type faster using any fingers to locate the keys and type. Darryl's response to the questions were:

> "I start out with my fingers on the home keys, but then I put my fingers anywhere.....I switch".

However, Jorge indicated:

> "I try to use correct fingering. If I want to type 'has' I have my fingers on h, a, and s already".

Jorge also felt that he could type faster with his fingers on the home keys. However, this was not the case during his *Type to Learn* and word processing sessions.

Maribel was the only student who attempted to use correct fingering during her word processing session. Throughout the word processing observation, Maribel had her fingers placed on the home keys at all times. Her fingers remained on the home keys when she reached to find other keys. However, she was observed to move forward frequently in an attempt to look at the keys. She also lifted her fingers from the keyboard to see the letters.

During the follow-up interview Maribel was also asked about her feeling regarding correct fingering. She admitted that she had some trouble locating the keys.

> "My hands were on the keyboard but they were in my way of getting to the letters. I had my fingers on the home keys like we do in *Type to Learn*. Your hands are on the keyboard, you look around to find them but you say 'I don't know where the letters are'".

Overall, the results of the observations and interviews indicate the six participants were not comfortable using correct fingering. The majority of the students used two hands, but only one finger on each hand. In the case of Maribel, she attempted to use correct fingering. However, this hindered her greatly in locating the letters on the keyboard.

My results correlate more closely to the research done by Kahn and Freyd (1990) and Kahn, Avicolli and Lodise (1990). They did not stress correct fingering, but still found their students able to use the keyboard with ease.

Self-Talk

Another theme that emerged from this study was self-talk. Cioffi (1984) defines self-talk as "writing orally". As he studied primary age children, he noted "children frequently articulated words as they wrote them on the page" (p. 177). Children progress through phases as they are writing. Beginning writers use more oral language as they

write. However, the talk occurs less frequently as children become more proficient writers.

Similar behaviors were noted in this study. Five of the six students participated in some form of self-talk throughout the study. Self-talk took three forms. First, the students would say the letters and keys aloud as they typed. Second, the students would use talk as a means of self-praise. Finally, self-talk was used to monitor their progress, independent of me.

In the initial stages of the study, the self-talk was quite loud and a steady chatter could be heard throughout the room. However, by the fourth week, many of the students had now begun to whisper as they used *Type to Learn*.

Of the six participants Darryl and Jorge used self-talk most frequently. Darryl could be heard "talking " the keys as he typed "jf ...jf... jf...space". Shortly after typing a group of letters, an accuracy level would appear on the screen. Darryl would use self-talk as means of self-praise. Darryl expressed excitement as he had begun typing the letters j, k, and l.

"1 more 100% to go! I went the whole ways up. I filled the whole space up! Darryl continued to praise himself with talk as he reached the top row of letters. He began to type: "ju..ju..ju..ju". A few minutes later, he was heard saying: "fff...rrr....fff...rrr". He further demonstrates self-praise when he says:

"Now I'm higher! It used to be fj, now it's fr".

As the study progressed, the letter patterns turned into words and the self-talk occurred less frequently. Darryl had begun to whisper but the talk was still apparent.

Jorge was another student who used self-talk throughout the study. Jorge's self-talk was used to say the letters and words aloud as he typed them. He also used self-talk to self-monitor his progress.

Jorge was heard reading the keys: "fff and sss" as they appeared on the screen. Before he began to type them though he said:

"I have to practice my f's and s's".

This self-talk served as means of understanding the procedure but as he typed further it was noted that Jorge self-monitored his progress when the accuracy level appeared on the screen.

"Ooh! I keep getting 96!"

As Jorge progressed through the *Type to Learn* program, he continued to work independently and self-monitor. In one instance, Jorge had completed a game break and received a "congratulations" message on the screen. Rather than ask me what he should do, he continued his lesson and was heard to say:

"Now I have to get back to this".

By the third week, Jorge's self-talk was very fast. At this point he was typing words rather than letter patterns. Just one week later, though, Jorge's self-talk was merely a whisper but sometimes no talk could be heard.

The data from this study have a direct correlation to Cioffi's theory on self-talk. Jorge and Darryl began this keyboarding program with little or no experience on the keyboard. They used self-talk as means of becoming familiar with and remembering the keys. However, as they practiced they became more comfortable. They relied less on self-talk and more on their abilities to locate the keys from memory. The children in

Cioffi's study (1984) spelled and decoded words orally as they wrote them (p. 187). These behaviors occurred less frequently as they became better writers.

Pencil and paper versus keyboard

Balajthy (1988) presents a study by Campbell (1973) in which she discussed the benefits of learning to write with a typewriter. The benefits include less demanding psychomotor requirements and more positive attitudes towards learning to read and write. (Balajthy, 1988, p. 40).

The students in this study were interviewed after six weeks of keyboarding instruction. The following question was posed to each student: If you were to sit down and write a story right now, would you be able to type more or write more with pencil and paper?

Five of the six students felt they would type more rather than write more. Bailey commented:

> "I think I could type more. When I write, my wrists hurt a lot and I slow down. If I write on the keyboard, I just use my fingers to type".

Like Bailey, Jorge also feels that he could type more. However, he commented that, "Maybe I could write more with pencil and paper because on paper it looks long but when you type it looks short." When prompted further, Jorge added:

> "Typing would be easier to write a story. You can just press the keys. But with pencil and paper, your pencil might break if you press too hard to make dark print".

Melinda and Maribel also felt that they could type more. Melinda explained,

> "I can get my ideas down faster on the computer because I can find the keys. When I use the computer, I do not worry about spelling because it checks it for me by putting lines under the words. The computer already writes neatly for me".

Maribel had a similar response.

> "I think I can type more. It goes faster than pencil and paper. Every time I write with pencil and paper I can't think and I get mixed up. When I write I forget periods and stuff and I get stuck. On the computer, I can just put it in…I can just think to put my periods in".

Unlike these students, Darryl felt that he would write more with pencil and paper. He reasoned that:

> "My hands are faster when I write with my pencil. I can just write. If I write I don't have to look for any letters because they are already in my head".

The majority of responses to this question indicate that the students are comfortable using the keyboard to compose and find it easier than writing with pencil and paper. These findings coincide with those of Campbell (1973). Two of the students mentioned motor demands as a reason to type. They see the ease of typing. They have come to realize that when they type they are not concerned about their pencils, dark print, or even pain in their wrist. In addition, typing also makes it easier to revise and edit their writing without erasing or rewriting.

The results of this study echo the findings of Kahn and Freyd (1990). "Simply being able to key in letters more quickly and easily than writing with pencil and paper had important consequences for the children in our studies (p. 87). As Kahn (1988) noted,

> "When they learn the location of the keys, children find using a keyboard easier than writing with pencil and paper. They write longer, more detailed pieces, edit them more thoroughly, and revise in ways they have not tried with pencil".

Conclusion

Prior to this study, the participants had little or no experience with the keyboard. It was difficult for them to locate the keys, which hindered their potential for using a word processing program. However, after six weeks of keyboarding instruction, these

students demonstrated that they were able to effectively use a word processing program. This study demonstrates that six weeks is an appropriate time frame for learning the keyboard. The students learned the location of the keys and typed at a reasonable pace without using the correct finger positions. These findings directly contradict the assumptions made by other researchers. The students' level of success is not only obvious in my observations but also in their own perceptions. In the beginning these students had great difficulty locating the keys. Six weeks later, though, they reported that they were so comfortable with the keyboard that they would choose to type a story rather than write with pencil and paper.

Implications

Now that I have concluded my study and analyzed the data, I have had an opportunity to reflect on all aspects of this study. Certain implications come to mind, which include the effects of my experience on future studies.

Overall, this study was a positive experience for both the students and myself. The students were motivated and approached this task with enthusiasm. As the students worked through the *Type to Learn* program, they worked independently. I attribute much of this to the format of the program. The program provides immediate feedback to the students on both mistakes and accuracy. Based on the observations of my students, *Type to Learn* is an easy program to use. In this respect I feel it made it easier to play the role of the researcher to collect the necessary data. One drawback to *Type to Learn* is that it encourages the use of correct finger positioning. Although my students did not use correct fingering, it gave them an opportunity to discover their own comfort level with

regard to the keyboard. Based on my observations and findings I plan to use *Type to Learn* in the future.

An implication for a future study on keyboarding is self-talk. The students in this study had a great deal of self-talk as they progressed through the *Type to Learn* program. As the study began there was a great deal of chatter amongst the six students. The chatter involved self-praise, self-monitoring and reading letters aloud as they typed. However, the self-talk gradually decreased to a whisper after four weeks. This behavior should be considered quite appropriate as the students are learning a new skill. They will talk less frequently as they become more proficient.

An implication for future studies is the location of the computers. One change I would make is to conduct this study in a computer lab setting. My study was conducted in the school library, which houses only ten computers. Throughout the study, only one half of the class could use the computers at a time. The other students read independently while they waited for their turn on the computer. This proved to be a management issue at times. I had to be the researcher and collect data yet also ensure that the other students were on task. If this study had taken place in a computer lab, I feel there would have been fewer management issues. All students could have been using *Type to Learn* at the same time. As mentioned previously, the students worked independently while using *Type to Learn*. I feel I would have had more meaningful opportunities to collect data and to coach children in a computer lab setting.

Another drawback in this study was the location of the computers in the classroom. Once the students had completed six weeks of *Type to Learn* instruction, they were observed using word processing in the classroom. At the time, the library

computers did not have a word processing program installed. As a result, the students used one of three computers in the classroom. These computers are located against one wall near the sink and water fountain. While the students worked at the computers their backs are facing the class. However, if all three computers were being used the students could easily turn to talk with or look at the person next to them. In addition, the other students in the class would walk by and look over the shoulders of those students working. They would also interrupt if they went to the sink or got a drink from the water fountain.

If I were to do the study differently and there was more space, I would place the computers in a more isolated location farther from the water fountain. In addition, the computers could be placed so that the computers sat back-to-back rather than side-by-side. Word processing could also be done in a computer lab. Each student would have their own computer to use and all students would be using word processing at the same time. As a teacher, this type of situation would be easier from a management standpoint. All students are involved in the same task. My experiences showed that the students not on the computer were wasting time while they waited for their turn on the computer. It was a challenging task to be the researcher while in my classroom. Other students around them distracted the students on the computer. I was also challenged because I played the role of teacher and researcher.

One drawback to using word processing in a computer lab is scheduling and travel time. All classes in the school have a scheduled time, leaving very few open times for the lab. My students were scheduled one time per week in the computer lab. In addition, time could be lost as the students travel to and from the computer lab.

However, I have more flexibility when I use the computers in the classroom. My students are able to use the computers more frequently each day throughout the week.

Another implication of this study has to do with student progress and their perception of their keyboarding ability. One of the most surprising findings was that most of the students would choose to type rather than use paper and pencil. This information was gathered from interviews completed after six weeks of keyboarding. I feel this could have had more of an impact if there were interviews done before and after the study. I would have chosen to ask the same questions to measure student perceptions and attitudes. The results of both interviews could have been compared.

The students will need continuous practice on the keyboard using a word processing program in order to further their skills. As this occurs, it would be interesting to study students using word processing with a particular focus on revising and editing on the computer rather than on pencil and paper. Based on my interviews of the participants, they all feel they have the basic skills to revise and edit. It seems logical to me then to conduct a study with students using a word processing program. My intention would be to see if students were more willing to revise and edit on the computer rather than on pencil and paper. At the present time, my students are writing a lot on pencil and paper. They are reluctant to revise and edit because of the time and effort involved. My hope would be that the students see the ease of cutting and pasting ideas while using word processing. I would be curious to know if they would write longer, more elaborate pieces.

As I reflect on this study as a whole, I feel this was a valuable and worthwhile study. The main goal of the study was attained. I began with the intention of my

students becoming more proficient on the keyboard in order to use a word processing program effectively. Based on my findings and the analysis of my data, I am able to conclude that the students reached the goals of this study. The students learned the keyboard while using *Type to Learn* and showed that they could locate the keys with ease. At this point my students are motivated and more excited about writing now that they can take advantage of word processing. I am excited by the possibilities of my students using word processing to write.

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Appendix

Students were asked the following questions at the conclusion of this study.

1. Do you feel you are able to find most or all of the letters on the keyboard right now?

2. Now that you have learned the keyboard, will you try to use correct fingering?
   a. Are you more comfortable using correct fingering or placing your fingers on any keys?

   b. How are you able to type the fastest, using correct fingering or not using correct fingering?

3. If you were to sit down and write a story right now, would you be able to type more or write more with a pencil and paper?

4. Do you feel you have the skills to revise and edit a piece of writing?

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